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complete meterological record in accordance with the instructions laid down by the U. S. Weather Bureau, for voluntary observers.

There is immediate prospect for an improved outfit in seismographs at at least three stations in California. The Carnegie Institution is installing seismographs at its Solar Observatory on Mount Wilson, the U. S. Weather Bureau on Mount Tamalpais, and Professor OMORI has brought one of his instruments, magnifying about 100 times, from Japan, and is setting it up at the Students' Observatory. The United States government ought to create a seismological commission with powers and functions similar to those under which the Japanese Imperial Commission is acting. The organization of seismological societies in various States, coöperating with the International Seismological Association, would also add much to the promotion of seismological research.

A. O. LEUSCHNER.

Berkeley, Cal., June 9th.

Members of the society who are located in California will render material aid in the investigation of earthquake phenomena in this State, if they will carefully record future shocks in accordance with the scheme outlined below. All communications should be addressed to the State Earthquake Commission, University of California, Berkeley, California.

Give information on the following:

1.—Postoffice address; town, county, and State.

2.—Place and date of observation.

3.—Name and address of the observer, if other than the writer.

4.—Give estimate of the intensity of the earthquake on the Rossi-Forel Scale. The Rossi-Forel Scale as amended by the commission is as follows:

I. *Perceptible,* only by delicate instruments.

II. *Very slight,* shocks noticed by few persons at rest.

III. *Slight shock,* of which duration and direction was noted by a number of persons.

IV. *Moderate shock,* reported by persons in motion; shaking of movable objects; cracking of ceilings.

V. *Smart shock,* generally felt; furniture shaken; some clocks stopped; some sleepers awakened.

VI. *Severe shock,* general awakening of sleepers; stopping of clocks; some window glass broken.

VII. *Violent shock,* overturning of loose objects; falling of plaster; striking of church bells; some chimneys fall.

VIII. Fall of chimneys; cracks in the walls of buildings.

IX. Partial or total destruction of some buildings.

X. Great disasters; overturning of rocks; fissures in the surface of the earth; mountain slides.

5.—Give any facts that you can as to the directions the earthquake waves seemed to travel. Describe the character of the shock, whether a temblor or an oscillatory motion, etc., and whether you, yourself, or others, had any clear impressions as to the direction in which it was moving, the facts on which this impression was based and whether people agreed as to the direction.

6.—Give also any further particulars of interest, whether they are from observation or hearsay. If any changes occurred in the ground, such as depressions or elevations of the surface, fissures, emissions of sand or water, describe fully. Character of damage to buildings. General direction in which walls, chimneys and columns in cemeteries were overthrown. Springs, wells and rivers are often notably affected, even by slight shocks, and any information in regard to such changes will be valuable.

7.—State as exactly as possible the *time of commencement* and the *duration* of each shock.

The exact time of the beginning of a shock (to the nearest second,) one of the most important of all observations, is difficult to get correctly, because of the great velocity with which the wave travels, and because the watch or clock must be immediately compared with a clock known to be keeping standard time. If several hours have elapsed before the comparison is made, another comparison should be made an hour later, in order to find whether your timepiece is gaining or losing. The observation cannot be regarded as a good one, unless it is stated that this has been done. Telegraph operators, railroad officials, watchmakers, etc., have especially good opportunities for answering this question correctly, and their co-öperation is most earnestly solicited.

If a clock was stopped, give the exact time it indicated (and anything known, as how fast or how slow it was,) its position, the direction in which it was facing, and the length of the pendulum.

8.—If a shock was not felt in your neighborhood, although noticed at places not very far distant, do not fail to answer the first four questions, as negative reports are of great interest in defining the limits of the disturbed area, etc. State also the nearest point to your station where the shock was felt.

9.—Name the writer.

A. O. LEUSCHNER.

Berkeley, Cal., June 9th.

Secretary California State Earthquake Investigation Committee.

HEIGHT OF THE HYDROGEN FLOCCULI.

The first photographs of the Sun in hydrogen light were taken with the Rumford spectroheliograph of the Yerkes Observatory in 1903. The $H\beta$ line was used. Upon developing the plate, Mr. ELLERMAN and I were surprised to find that instead of bright flocculi, similar to those obtained with the H and K lines of calcium, *dark* flocculi, of similar form, were present. Subsequent photographs showed that the hydrogen flocculi are ordinarily dark, though in the case of active eruptions, and sometimes in the immediate vicinity of Sun-spots, these flocculi are bright. With the Rumford spectroheliograph, it was possible to photograph only narrow zones of the solar image in hydrogen light, but with the spectroheliograph now in use with the Snow telescope on Mount Wilson, the entire solar disk is photographed daily with one of the hydrogen lines.

The darkness of the hydrogen flocculi was accounted for provisionally on the assumption that the regions shown are at a considerable elevation in the chromosphere, where the temperature is low enough to produce absorption. Independent evidence in favor of this idea has recently been afforded by the demonstration that the comparatively rare *dark* calcium flocculi are characterized by the widening of the H_3 and K_3 lines (due to the high level calcium vapor) and that these occasional dark calcium flocculi are almost invariably associated with very strong dark hydrogen flocculi. Some uncertainty as to the elevation of the ordinary dark hydrogen flocculi would still remain, however, since the exceptionally dark hydrogen flocculi just referred to might perhaps be at